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30 January 1980

MEMORANDUM FOR THE RECORD

SUBJECT: Impact of an Embargo on Selected

Industrial Products

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The attached paper was prepared for the Department of Commerce in response to a request from J. Mishell George, Acting Deputy Assistant Secretary of Commerce for East-West Trade. The paper discusses Soviet requirements, foreign availability, and impact of an embargo in specific industrial sectors. Commerce requires the paper in support of a DOC study of policy options for export control. Contributors to the paper were:

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ATTACHMENT

Impact of an Embargo on Selected Industrial Products

Attached are our analyses of the effects on the USSR of unilateral and multilateral embargoes in various industrial sectors.

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28 January 1980 Central Intelligence Agency National Foreign Assessment Center Office of Economic Research

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Petroleum Equipment

Soviet Requirements

The USSR produced 11.7 million b/d of oil in 1979, but growth in output is slowing. The 270,000 b/d production increase last year was the smallest annual rise since 1956. Output is now declining in all of the major oil producing regions except West Siberia, and production gains there will be much more difficult now that the giant Samotlor oilfield has about reached its peak. Samotlor has accounted for the bulk of Soviet oil production growth in recent years, and output there is likely to decline in the next year or two and then fall rapidly thereafter. By 1985, Soviet oil output probably will fall to 10 million b/d and possibly as low as 8 million b/d. Production is more likely to be closer to the higher figure if exploration efforts are relatively successful, development drilling goes well, and Moscow acquires the oil production equipment and technology it needs -- mainly from the West.

Foreign Availability

During the last two or three years, Soviet petroleum officials have become aware of the problems facing their industry and have entered into negotiations and contracts with US and Western firms to undertake major projects for upgrading petroleum industry capabilities. The following cooperative ventures have been proposed with US firms in which the US is to supply equipment, technology, and technical assistance:

- offshore exploration and development in the Barents Sea.
- Onshore exploration and development in deep, subsalt basins -- Pre-Caspian, North Caucasus, Turkhmen, West Siberia, and East Siberia.
- c. Enhanced oil recovery -- use of carbon dioxide (CO₂) injection in several large fields in the Urals-Volga region.
- d. Pipe plant to produce high quality drill pipe, casing, and tubing.

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e. Refining technology (secondary processing) for efficient output of high quality light products.

Two other projects involving delivery of US and Western equipment and know-how are: (1) Dresser drill bit plant, of which about one-third of the contracted equipment and technical plans has been shipped; (2) the deal concluded with the French firm, TECHNIP, for gas lift equipment for the Samotlor and Federov oilfields in West Siberia; none of the French equipment for this project has been delivered. Another important project under discussion is for fabrication yard to build offshore drilling rigs. Several foreign consortia --French, Germany, British, Japanese -- are competing in the bidding. All but the French bidder includes a US firm as a partner or subcontractor. During the past year the Soviets have also purchased and ordered some 80-100 vibroseis systems to conduct exploration work in regions such as East Siberia and the Caucasus where complex geologic structures requires such equipment.

Impact of an Embargo

A short-term US-only embargo on exports of oil equipment would have little impact on Soviet oil production in the next several years. The impact of a short-term embargo by the entire West might have a somewhat greater effect on oil production, although how much is uncertain. A short-term embargo by the United States alone is unlikely to have much of an impact on Soviet gas production, as the USSR buys very little from the US. However, the failure of some US firms to deliver much-needed spare parts for gas turbines at gas pipeline compressor stations and spare parts for pipelaying tractors could result in-slowdown in gas deliveries within 6-18 months unless alternative sources of supply in Japan, Germany, or the UK could be acquired quickly. A short-term embargo by the entire West probably would begin to take effect within the year, depending on Soviet inventories, because the Soviet gas industry is greatly dependent on Western Europe and Japan for deliveries of large-diameter pipe, compressors, and valves.

A longer term embargo could have a major impact on Soviet oil production in the late 1980s only if sustained for many years in cooperation with our allies. The kinds of items that the Soviets would need to carry out onshore and offshore

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programs include -- in addition to technology and knowhow -- drilling rigs and platforms, subsea production equipment, well-completion including blow-out preventers, submersible pumps, gas lift equipment, and seismic equip-They will also need equipment for enhanced recovery, e.g., steam generators for thermal recovery and chemicals for chemical and miscible flooding. Although US firms dominate the world market for petroleum exploration and production equipment, their positions could be seriously eroded in two or three years as other Western suppliers enter the market. If, however, a US long-term embargo were partially supported by other Western countries, Soviet oil production probably would decline more rapidly than we now expect, greatly reducing the chances that the fall could be slowed or stemmed in the late 1980s. Moreover, the lack of Western equipment, technology, and expertise for 2 to 3 years would have a greater impact in the latter half of the 1980s as Western assistance is needed for deep onshore and offshore exploration and production.

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The effect of a long-term embargo of Western gas equipment would be severe and could cut the annual growth in gas output during 1981-85 in half, from 7 percent to 3.5 percent, or about 250,000 b/d of oil equivalent. The impact of such a decline would be magnified as Moscow is counting on rapid growth in gas production to offset stagnating oil and coal output.

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Machine Tools	237
Requirements	
dernization of the Soviet machine tool sector requires nuing supply of machining centers as well as other f numerically controlled (NC) machine tools from the	
In addition, the Soviet effort to improve the toler- f machine tools requires the importation of highly e grinders for manufacturing the bearings used in	
ecision spindle assemblies.	25 X
Availability	
arly all Soviet imports of NC machine tools and machin- ters for the past several years have originated in ad West Germany, and to a lesser extent in other West a countries. Grinders for the manufacture of precision are imported from the US, but many of the COCOM as are capable of supplying roughly comparable equip- two non-COCOM West European countries Switzerland ten can provide some, but not all of the types of tools being imported by the USSR, and only in limited	
28.	25X
to an Embargo	
milateral US embargo on NC machine tools would have mpact. If other COCOM countries were to join in ng all NC machine tools, the impact on the USSR	•
mplicate production problems in the Soviet aircraft, and denial of grinding equipment could, over the un, inhibit production of high accuracy bearings tary products. In a broader sense, denial of machiners and NC machine tools would hamper efforts	
the Soviet machinebuilding industry more efficient.	25X
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	Telecommunications Equipment
Soviet Requi	rements
The USSI nodernize its nent are involved to the contract of th	R is engaged in a major, long-term effort to stelecommunications system. All types of equipolved: transmission equipment (cable and radio inal equipment (voice and data), and switching aid in this effort, the USSR has shown an importing both hardware and manufacturing tech-
oreign Avail	lability
echnology is countries.	telecommunications equipment and manufacturing s available from other COCOM and non-COCOM In particular, L. M. Ericsson of Sweden, a untry, is a major manufacturer of modern tele-
	ns equipment.
celecommunication in the impact deny much mode could be circle to participate ave little in the lecause the lecaus	Embargo ral action by the US to limit the export of ations equipment and technology would have ton the USSR. Multilateral COCOM controls would dern technology to the USSR, although the denial cumvented in part if non-COCOM countries refused te. However, even an effective embargo would impact on the USSR's military posture. This is USSR's existing telecommunications system is at the for military purposes, and in any case a
ajor moderni	ization of the system would be a long term
rocess.	
eriod of tin	of Western communications equipment over a long me would seriously retard Soviet plans to intro-
of information	mated system for the collection and dissemination

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Automotive Sector	
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Soviet Requirements	25 X 1
The USSR has been modernizing its automotive sector	
for several years. Toward this end, the USSR has been import- importing from the West mainly high volume, high productivity	•
machinery for producing, machining, and assembling engines,	
drive-train components, and body parts. The Soviet moderni-	
zation program is only partially completed and will require	
a continuing high level of imports for many years.	. 25
Foreign Availability	
	٠
Most types of automotive production machinery are	
available in Western Europe and Japan. The Soviets prefer	
US equipment in a few cases because of its superior quality and durability.	2
and databases.	
Impact of an Embargo	
A unilateral US embargo on automotive production machinery would have little military impact. It might delay,	
but would not seriously impede progress for the expansion of	
truck production with a dual-purpose role. If COCOM countries	
support the embargo, the impact would be substantial; in	
particular, it would slow down future Soviet programs to produce new heavy trucks. The civilian economy has a long	
way to go in reducing its dependence on an overburdened rail	•
transport system. Failure to increase production of heavy	
trucks will force the USSR to use more trucks and more man-	
power to meet military transport requirements.	2
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Chemical and Petrochemical Equipment	
Soviet Requirements	
Modernization of the Soveit chemical and petrochemical industries largely requires equipment and technology for	
complete, nightly automated installations for producing	•
and processing a wide range of agricultural chemicals,	¥*
polymers (plastics, fibers, synthetic rubber), and petro- chemical intermediates (ammonia, ethylene, butadiene and	
others). Examples of some important types of equipment	
needed include large centrifugal compressors, dryers used	
In producing synthetic rubber, plastics processing equip	
ment for producing fine films and automated equipment for plastics injection and compression molding.	25X ²
	20/
Foreign Availability	
In most cases equipment and tochnology for	
In most cases equipment and technology for manufacturing the chemical products cited above are available from Western	
but ope and Japan. New, more economical HS technology for	
producing low-density polyethylene by a low-pressure process	•
is not yet believed to be available elsewhere, but products	
with similar properties can be made with processes available in Western Europe, Japan, the USSR, and East Germany.	25X′
and East Germany.	.201
Impact of an Embargo	
The chemical products with a second a second	•
The chemical products cited would largely have consumer and industrial end-uses. A unilateral embargo of chemical	•
technology undertaken by the US would have little if any	
effect on Soviet military capabilities in the next two to	•••
direct years and probably a minimal impact even in five	
years. An embargo by the US. Western Furone and Janan	
would have a somewhat greater but still modest effect on Soviet military capabilities. Even then, the embargo	
would have to include the sizable volume of chemical equip-	
ment ordered by the USSR in the last 4-5 years.	25 X ′
	20/
The principal impact of an embargo on chemical equip-	
ment and technology would be to slow future increases in Soviet production of consumer goods and chemical-based industrial materials and all goods and chemical-based	
industrial materials and delay Soviet progress toward a	
more efficient chemical industry with enhanced export	•
capabilities.	25 X 1
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Metallurgical Technology and Equipment	
Soviet Requirements	
The USSR is placing increasing reliance on foreign	•
suppliers of technology and equipment to help reverse the recent slowdown in growth of its steel industry	
and to modernize and adapt the industry to changing	
needs of the economy. Deficiencies in the quantity.	•
quality, and assortment of Soviet steel products have necessitated annual steel purchases from the West of	
over \$2 billion since 1974.	25 X 1
The Soviets have shown interest in a wide range of equipment and technology. Their largest contracts placed	
so far have been to equip an integrated steel plant at	
Kursk. They have ordered iron ore pelletizing facilities.	·
a direct reduction installation, and electric furnaces.	
Later they will need continuous casters and rolling mills. Another major interest is in facilities to produce silicon	
steel for generators and transformers. Other types of	•
equipment already ordered or under negotiation include	
neat treatment lines, specialized melting furnaces, automa-	,
tion systems, process control instrumentation, stainless steel processing lines, galvanizing lines, production	
planning and control systems, and rolling mills.	25 X 1
	20/(1
The USSR also is seeking Western assistance in promoting further growth of its aluminum industry. The Soviets are	
turther growth of its aluminum industry. The Soviets are interested in expanding their smelting capacity using	
Western technology but on the basis of compensation arrange-	
ments permitting exports of aluminum to Western markets.	25X1
Foreign Availability	i
ouely. Italiability	•
The types of steel industry equipment and technology	
sought by the Soviets are available from mill builders	•
and engineering firms of Japan and Western Europe. In some cases, such as silicon steel, US firms enjoy a com-	
petitive edge, but essentially the same technology is	•
vailable from non-US suppliers. Similarly, technology	
and equipment for the aluminum industry are available	
rom other than US suppliers. The French firm, Pechiney- Jgine-Kuhlmann, is most prominent as a supplier of such	
equipment and technology.	25 X 1
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Impact of an Embargo

A unilateral embargo by the United States would have little impact because of the availability of similar technology from other Western countries. Some sacrifice for the Soviets would be involved because of certain technical advantages of US technology and because of minor delays in adjusting to alternative technologies and delivery schedules. An example would be the loss of Alcoa's highly automated technology which has been particularly attractive to the Soviets because of the manpower shortages they are confronted with in the metallurgical industries and elsewhere.

A multilateral Western embargo would disrupt the ongoing Soviet program to use Western equipment to spur steel industry growth and to produce the quality steels needed in growing amounts. The current state of Soviet dependence on imports of steel would be prolonged well into the 1980s. A Western embargo would have no immediate effect on Soviet capabilities to produce steel for military purposes. The types of equipment and technology sought by the Soviets are needed to produce steel for general use throughout the economy. Indirectly, however, to the extent that steel industry growth and modernization are hampered, Soviet capabilities to produce for military purposes suffer.

The consequences of a Western embargo of technology for the aluminum industry would be far less serious. The USSR already ranks as a leading world exporter of aluminum. The Soviets would accept slower growth in the aluminum industry because domestic consumers would not be hurt. In any event, the USSR would have little difficulty in expanding domestic smelting capacity as the need developed.

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The Soviets last year proposed to several West European countries a deal to provide electricity in exchange for West European firms' supplying equipment and technology for nuclear power plants in the USSR. Discussions for a similar deal

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•	with West Germany in 1973-74 came to naught. The current negotiations with the Italians and West Germans are at an early stage. In an unrelated transaction, an Italian firm signed a small contract in December for pumps for nuclear power plants.	. 25
	Gas Lift Project	
	With the imposition of US controls on export of oil and gas equipment in 1978, the Soviets awarded a contract for gas lift equipment for the Samotlor and Federovsk	25X′
	oil fields to the French firm, Technip. Deliveries of com- pressors and manifolds by the French will begin next month and will continue through October 1981. Some other equip- ment scheduled for delivery next month has been delayed be-	
ţ.·	cause US microprocessors are not available. Sayansk Aluminum Smelter	2
	a deal in which Soviet technology would supplant Alcoa's.	
		2
	Pipe Plant	2
	Pipe Plant West German and French firms won a \$230 million contract in March 1979 to equip a Soviet plant to product 170,000 tons per year of 10-inch pipe (not pipe for gas transmission lines). Deliveries have probably only just begun, if at all. The plant is scheduled for start-up in 1983.	
	West German and French firms won a \$230 million contract in March 1979 to equip a Soviet plant to product 170,000 tons per year of 10-inch pipe (not pipe for gas transmission lines). Deliveries have probably only just begun, if at all. The	
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Four consortia were in the bidding as of last summer: a French group, a British group which included a US firm, a German group, and a Japanese group which included a US firm.

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Drill Pipe Plant	• •
The Soviets have contacted several US firms for a	mota-
tions on a turnkey plant to produce 50,000 tons per ye	ar of
high strength drill pipe. Last November, the Soviets played new urgency in obtaining the equipment, moving	
to this month a meeting, which had been scheduled with firm for mid-1980.	a US
iirm for mid-1980.	
Oil Development Joint Ventures	
The Soviets have been discussing huge projects for	er ex-
ploration and development of offshore and onshore oil posits with Western firms	de-
At the lastest known meeting two months ago, a draft a ment was reportedly nearly completed. Some officials	gree-
the Ministry of Foreign Trade and Soviet energy minist	ries
have pushed the project, but it apparently does not have the approval in principle of	
Soviet government.	
	•
New Projects with Japan	
Last October the Soviets and Japanese agreed to 1	.ook
Last October the Soviets and Japanese agreed to linto several major Siberian development projects: a f	ook
Last October the Soviets and Japanese agreed to linto several major Siberian development projects: a fon to the timber project which expired at the end of lapulp and paper complex on Sakhalin Island; the expansion	ook ollow- 979;
Last October the Soviets and Japanese agreed to linto several major Siberian development projects: a fon to the timber project which expired at the end of lapulp and paper complex on Sakhalin Island; the expanof the Vostochniy Port; construction of an integrated	ook ollow- 979; sion steel
Last October the Soviets and Japanese agreed to I into several major Siberian development projects: a fon to the timber project which expired at the end of I a pulp and paper complex on Sakhalin Island; the expanof the Vostochniy Port; construction of an integrated mill; and development of copper deposits and construct	ook ollow- 979; sion steel
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Last October the Soviets and Japanese agreed to I into several major Siberian development projects: a fon to the timber project which expired at the end of I a pulp and paper complex on Sakhalin Island; the expanof the Vostochniy Port; construction of an integrated mill; and development of copper deposits and construct a smelter at Udokan.	ook follow- 979; sion steel ion of